

NON-PUBLIC?: N  
ACCESSION #: 9203230285

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Wolf Creek Generating Station PAGE: 1 OF 4

DOCKET NUMBER: 05000482

TITLE: A Reactor Trip Caused By A Failure Of A Gating/Sequencing Card In  
The Inverter For A 120 Volt AC Instrument Bus  
EVENT DATE: 02/19/92 LER #: 92-002-00 REPORT DATE: 03/20/92

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Steve G. Wideman - Supervisor TELEPHONE: (316) 364-8831  
Licensing

COMPONENT FAILURE DESCRIPTION:

CAUSE: X SYSTEM: EI COMPONENT: ECBD MANUFACTURER: W120  
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On February 19, 1992, at 2110 CST, after the failure of a gating/sequencing card in the inverter supplying a 120 volt AC safety-related instrument bus, a Reactor trip occurred on low-low water level in Steam Generator "A". As expected an Auxiliary Feedwater Actuation Signal, a Feedwater Isolation Signal, and a Steam Generator Blowdown and Sample Isolation Signal occurred. Also, a Control Room Ventilation Isolation Signal occurred when power was lost to Control Room Air Intake Chlorine Monitor GKAI03. The plant was in Mode 1, Power Operation, at 100 percent rated thermal power. The failed gating/sequencing card was replaced and the inverter restored to its normal power supply at 0745 CST on February 20, 1992.

A detailed evaluation is being conducted to determine the exact root

cause of the failed gating/sequencing card. A review of procedure OFN 00-021, "Loss of Vital 120 VAC Instrument Bus", has been conducted and while the procedure provides the necessary guidance to Control Room operators when responding to this type of event, enhancements are being incorporated into the procedure.

END OF ABSTRACT

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## INTRODUCTION

On February 19, 1992, at 2110 CST, after the loss of power to an instrument bus, a Reactor trip occurred on low-low water level in Steam Generator "A". As expected an Auxiliary Feedwater Actuation Signal (AFAS), a Feedwater Isolation Signal (FWIS), and a Steam Generator Blowdown and Sample Isolation Signal (SGBSIS) occurred. Also, a Control Room Ventilation Isolation Signal (CRVIS) occurred when power was lost to Control Room Air Intake Chlorine Monitor GKAI03 VI-AIT!. This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv) concerning unplanned actuations of the Reactor Protection System JC! and Engineered Safety Features JE! equipment.

## DESCRIPTION OF EVENT

Prior to this event, the unit was operating in Mode 1, Power Operation, at 100 percent rated thermal power. On February 19, 1992, at 2108 CST, 120 Volt AC Safety-Related Inverter NN11 EI-INVT! failed and de-energized vital 120 Volt AC Instrument Bus NN01 EE-BU!. This resulted in the pressure compensated steam flow channels JB-TC! for Steam Generators "A", "B", "C", and "D", which were being supplied by bus NN01, to fail low and the loss of various instruments and controls. This in turn caused the feedwater demand signals for the Steam Generators to decrease feedwater flow by modulating the Main Feedwater Control Valves SJ-FCV! closed and decreasing the speed of the Main Feedwater Pumps SJ-P!.

Power was lost to Control Room Air Intake Chlorine Monitor GKAI03 which resulted in a CRVIS and the controlling Pressurizer level channel JD-LC! failed low, which resulted in a Reactor Coolant System letdown isolation and an increase in Positive Displacement Pump (PDP) CB-P! speed when bus NN01 de-energized. Also, standby Component Cooling Water Pump (CCW) "A" CC-PT! started when pressure transmitter EGPT77 CC-PT! failed low even though CCW pump "C" was already in operation causing the Reactor Coolant Pumps' thermal barriers to close because of high flow.

In the Control Room, numerous alarms and annunciators IB! were received when inverter NN11 failed. The control rods, which were in automatic, began stepping into the core to maintain temperature because the T sub REF signal failed low. Rod control was placed in manual in order to stop rod motion after it was verified that a Main Turbine runback was not occurring. During an initial review of the Control Boards by the operators it was observed that the controlling Pressurizer level channel had failed low and an operable channel was selected. Also, it was observed that the PDP was tripped and Centrifugal Charging Pump (CCP) "A" CB-P! was immediately started to re-establish Reactor Coolant Pump Seal Injection.

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The Control Room operators took manual control of the Main Feedwater Control Valve associated with Steam Generator "A" when feedwater flow began decreasing. When feedwater flow began to decrease to the other Steam Generators, manual control was taken of all the Main Feedwater Control Valves in an attempt to restore feedwater flow. But because the speed of the Main Feedwater Pumps was decreasing, feedwater flow could not be increased to maintain Steam Generator water level. At 2110 CST, an automatic Reactor trip occurred as a result of level in Steam Generator "A" reaching the low-low level trip setpoint of 23.5 percent. Occurring in conjunction with the Reactor trip were a Main Turbine Trip Signal, an AFAS, a FWIS, and a SGBSIS.

The Control Room operators properly recovered from the Reactor trip and the Engineered Safety Features actuations in accordance with plant procedures. Bus NN01 was re-energized from backup power via the back-up power supply at 2118 CST. Reactor Coolant System letdown was returned to 120 gallons per minute at 2123 CST and CCW restored to the Reactor Coolant Pump thermal barriers at 2128 CST. The FWIS was reset at 2243 CST and the AFAS was reset at 2248 CST. Also, restoration from the CRVIS lineup was completed at 2300 CST. A failed card was replaced in inverter NN11 and the inverter restored to its normal power supply at 0745 CST on February 20, 1992.

#### ROOT CAUSE AND CORRECTIVE ACTIONS

The root cause of this event was the failure of a gating/sequencing card EI-ECBD! in inverter NN11. This resulted in a lowering of the water level in all Steam Generators since the controlling pressure compensated steam flow channels selected caused the Main Feedwater Control Valves to go closed and the speed of the Main Feedwater Pumps to decrease. A preliminary examination of the failed gating/sequencing card revealed

that there were cracked solder connections on the terminal board. It was inconclusive if the cracked solder connections caused the gating/sequencing card to fail. Therefore, the soldered connections on the gating/sequencing cards in the other three inverters were inspected and repaired as necessary. A detailed evaluation is being conducted to determine the exact root cause of the failure and the appropriate steps will be taken based upon the findings of this evaluation. It is anticipated that this evaluation will be completed by June 1, 1992.

A detailed review of procedure OFN 00-021, "Loss of Vital 120 VAC Instrument Bus", has been conducted and necessary enhancements will be incorporated into the procedure by August 31, 1992. Also, enhancements to the Control Boards are being considered to aid Control Room operators in immediately determining which separation group the controlling channel is selected to. This will allow the Control Room operator to immediately select out channels that are affected because of an instrument bus failure.

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#### ADDITIONAL INFORMATION

During a review of this event it was determined that Reactor Coolant Pump Seal Injection was not maintained for approximately two minutes after the PDP tripped and before CCP "A" was started. The PDP tripped after the controlling Pressurizer level channel was switched to an operable channel by the Control Room operator and the PDP tried to reduce the Pressurizer AB-PZR! water level back to the programmed level. It was determined that the lack of seal injection for two minutes would have no detrimental effects on proper operation of the Reactor Coolant Pump Seal.

Steam Dump Valves SB-V! ABUV34, ABUV38, ABUV41, and ABUV45 experienced operational problems while maintaining Reactor Coolant System AB! temperature. These valves have been repaired and retested satisfactorily. Also, during restoration of inverter NN11 to its normal power supply, Steam Generator "A" Atmospheric Relief Valve ABPV01 SB-RV! inadvertently opened. The valve was immediately closed. An investigation revealed that when inverter NN11 was restored to its normal power supply, pressure transmitter ABPT01 SB-PT! spiked high and with the present configuration of the system, the controller for valve ABPV01 caused the valve to open. Procedure OFN 00-021, "Loss of Vital 120 VAC Instrument Bus", will be revised by August 31, 1992 to provide guidance when restoring power to a failed instrument bus.

During the transient discussed in this report, the unit was placed in a stable, shutdown condition. At no time did conditions develop that may

have posed a threat to the safety of the plant or a threat to the health and safety of the public.

There have been no previous similar occurrences.

The failed gating/sequencing card was supplied by Westinghouse Electric Corporation/Hagan, Model Number 3443D72G01.

ATTACHMENT 1 TO 9203230285 PAGE 1 OF 1

WOLF CREEK  
NUCLEAR OPERATING CORPORATION

John A. Bailey  
Vice President  
Operations

March 20, 1992

NO 92-0086

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Mail Station P1-137  
Washington, D. C. 20555

Subject: Docket No. 50-482: Licensee Event Report 92-002-00

Gentlemen:

The attached Licensee Event Report (LER) is being submitted pursuant to 10 CFR 50.73 (a)(2)(iv) concerning an Engineering Safety Features Actuation.

Very truly yours,

John A. Bailey  
Vice President  
Operations

JAB/aem

Attachment

cc: A. T. Howell (NRC), w/a  
R. D. Martin (NRC), w/a

G. A. Pick (NRC), w/a  
W. D. Reckley (NRC), w/a

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